

Evolution of Functional Hand Prostheses on the Postal Stamps

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Losing a part of the upper limb or the hand is not an uncommon disability; however, using a prosthesis can improve the quality of life and working of the amputee.¹ This brief review presents the evolution of functional hand prostheses on the postal stamps; however, by no means it is a complete review.

A stamp issued by Hungary in 1987 demonstrates Ambroise Paré (1510–1590) and a design of a mechanical artificial hand (►Fig. 1). Paré was a French barber/surgeon. He not only contributed to the technique of surgical amputation but also presented a design of mechanical hand prostheses. He was an accomplished anatomist. Therefore, when he attempted to craft an artificial hand, he not only intended to conceal the deformity but also wanted it to work as a biological hand. The mechanical engineering of the Paré's artificial hand may be considered as a

precursor of the today's robotic hand. However, Paré's artificial hand did not have voluntary movement and was too expensive that only the wealthy individuals could afford it.²

Until the mid-19th century, the hand prosthesis for the common people consisted of a leather bucket and hook. In the Peter Pan fictional stories, the character of the pirates' captain acquired the name Captain Hook because he used a single hook terminal device on his lost right hand. A hook device instead of the right hand presents a character beyond regular appearance for the pirates' captain. The Captain Hook's right hand was cut off by Pan and was eaten by a crocodile. ►Fig. 2 demonstrates Captain Hook with a single hook stand terminal device for his lost right hand.³

Functional prostheses are divided into body-powered (cable-controlled) and externally powered (myoelectric).¹ In 1818, Peter Baliff, a German dentist, introduced the idea of automatic body-powered upper limb prosthesis.⁴ In the 1860s, the Comte de Beaufort in France adapted a design of prosthesis to enable the amputee to open and close a double



Fig. 1 The stamp shows the portrait of Ambroise Paré (1510–1590) and an artificial mechanical hand.



Fig. 2 A hook stand for the Captain Hook's right hand from the Peter Pan story.

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Fig. 3 Alvaro Alvim, the martyr of science, works with artificial hands.

spring hook, or flex and extend the thumb on a simple hand with fused fingers.⁴ A stamp issued by Brazil in 1963 depicts Dr. Alvaro Alvim (1863–1928) working with prostheses for his both hands (► **Fig. 3**). Dr. Alvim was a pioneer in radiology and radiotherapy. He worked in France with Pierre and Marie Curie and performed the first radiograph in Brazil. He lost parts of his both hands because of radiation burns.⁵

A functional upper limb prostheses consist of a socket, suspension component, terminal device, and, if applicable, an interposing joint. Active terminal devices may be a prosthetic hook or a prosthetic hand. In 1948, the Bowden introduced cable body-powered prosthesis.⁴ A stamp issued by Australia in 1972 demonstrates that an amputee is working with a cable body-powered prosthesis (► **Fig. 4**). A stamp issued by Canada in 2002 demonstrates a cable-controlled double-prong terminal device (► **Fig. 5**).

In the 1960s, externally powered (myoelectric) functional prostheses were introduced.⁴ A stamp issued by Belgium in 2008 demonstrates an upper limb functional prosthesis with individual digits and interposing joints at work (► **Fig. 6**).

Robotic prosthetic hands with individual articulated digits have been produced by the advances in the various technology fields. A stamp issued by Belgium in 1987 honored the developed technology of the prosthetic hand (► **Fig. 7**).



Fig. 4 An amputee using body-powered (cable-controlled) upper limb prosthesis is assembling an electrical circuit.

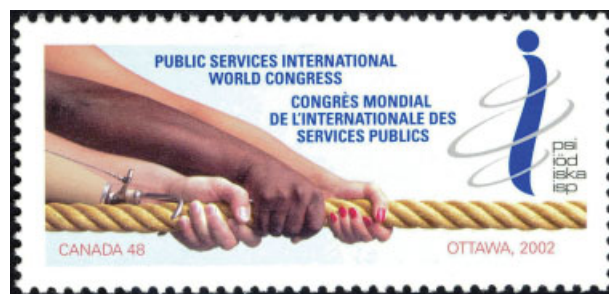


Fig. 5 Different working hands as well as a prosthetic hook pull the rope in one direction.



Fig. 6 Different clenched hands as well as a prosthetic hand form a tower.



Fig. 7 A hand is greeting a robotic prosthetic hand to honor technology.



Fig. 8 An i-hand (bionic hand).



Fig. 9 A hand touches a robotic hand. The theme has been inspired from the hands from the Michelangelòs fresco "Creation of Adam," located on the ceiling of the Sistine Chapel in Rome.

The i-LIMB was invented by David Gow in Edinburgh, Scotland, and was produced by Touch Bionics (Hilliard, Ohio, United States) is an example of the application of the sophisticated technologies to produce prosthetic hands.⁶ The i-LIMB is a myoelectric prosthetic hand with articulated fingers and thumb. Each finger contains its own motor power and gear box and works independently; however, the thumb must be positioned manually.¹ A stamp issued by Great Britain in 2015 honored the development of i-hand (►Fig. 8).

The Michelangelo prosthetic hand (Otto Bock, Minneapolis, Minnesota, United States) is a new state-of-the-art generation of myoelectric prosthetic hands with independent powered opposable thumb and fingers.¹ A stamp issued by Italy in 1999 demonstrates a robotic hand is near to touch the God's hand (►Fig. 9). The theme of the stamp is inspired from the hands from the Michelangelòs fresco "Creation of Adam" located on the ceiling of the Sistine Chapel in Rome.⁷

Conflict of Interest

None.

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